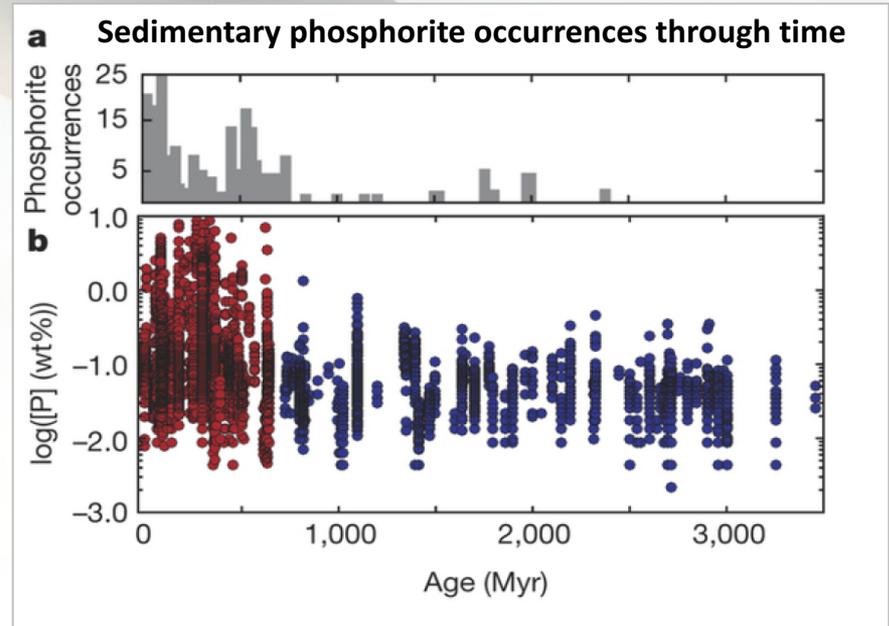


# Phosphorus: The key to life on Earth as we know it?

**BACKGROUND:** Phosphorus is thought to have limited the growth and productivity of life in the oceans on geological timescales. However, it remains uncertain whether phosphorus limitation persisted throughout Earth's history and whether the phosphorus cycle has consistently influenced productivity and therefore ocean-atmosphere oxygen levels over time.

**THE RESEARCH:** This team investigated phosphorus abundances in marine sedimentary rocks spanning the past 3.5 billion years, and they find evidence for relatively low phosphorus burial in shallow marine environments until about 800 to 700 million years ago. Further, they find that the dynamics of phosphorus and other nutrients could have constrained the planet's atmosphere at low oxygen concentrations.



**TAKE-HOME:** Phosphorus concentrations in shallow waters increased around 800 million years ago, coincident with a significant spike in oxygen content of the oceans and atmosphere. This timing suggests phosphorus scarcity and then relative abundance may also explain the long-delayed oxygenation of Earth's surface. **It was following this rise in atmospheric oxygen that the abundance of complex life such as algae in the oceans increased for the first time—followed not long after by the evolution and appearance of more advanced animals.**